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10/759,246	01/20/2004	Edward G. Sergoyan	05165.1280	7082

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EXAMINER	
KRAMSKAYA, MARINA	

ART UNIT	PAPER NUMBER
2858	

DATE MAILED: 02/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/759,246	SERGOYAN ET AL.	
	Examiner	Art Unit	
	Marina Kramskaya	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-15 and 17-23* is/are rejected.

7)☒ Claim(s) *4 and 16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 August 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 1 recites the limitation " the processing unit " in line 9. There is insufficient antecedent basis for this limitation in the claim.

2. Claim 11 recites the limitation " the processing means " in lines 9-10. There is insufficient antecedent basis for this limitation in the claim.

3. Claim 11 objected to because of the following informalities: it recites the limitation "or having". It is unclear what choices of elements are presented. For the purposes of this examination it will be interpreted as a "a processor means for processing, coupled to the signal detecting means, *having*; correlating means..."

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 3, 5-6, 11-12, 15, 17-18 and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Kesil et al., US 6,989,675

As per Claim 1, Kesil discloses a thickness measurement system (ABS., lines 1-2) for measuring a film thickness of a sample (**F**), comprising:

an electromagnetic cavity resonator (**22**) having an exposed side (**24**) adapted to contact a portion of the surface of the sample (**F**);

an attachment assembly (actuating mechanism **131**) adapted to press the cavity resonator to the portion of the surface of the sample (column 10, lines 18-21);

a signal decoupler (**36**) coupled to the cavity resonator (**22**);

a signal amplitude detector (oscilloscope **58**) coupled to the decoupler (**36**) (ABS., lines 13-15);

a frequency signal generator (combination of microwave generator **32** and frequency modulator **44**; see column 9, lines 52-55) coupled to a processing unit (**52**: column 16, lines 2-6) and to the decoupler (**36**);

the processing unit (**52**: column 16, lines 2-6) coupled to the amplitude detector (**36**) that processes; and

a correlating algorithm (equation (10), in column 13) correlating a resonant frequency shift (ω, where ω_o is the resonant frequency) detected by the amplitude detector to the film thickness (δ) of the portion of the surface (**F**) of the sample being

measured, wherein during the measurement the exposed side of the cavity resonator is pressed against the portion of the surface of the sample (column 10, lines 18-21).

As per Claim 3, Kesil discloses a thickness measurement, wherein the frequency signal generator is one of a Gunnplexer or a Gunn Diode (column 9, lines 38-41).

As per Claim 5, Kesil discloses a thickness measurement system, wherein the amplitude detector detects a voltage (see FIG. 7A-7C, where U_r represents voltage).

As per Claim 6, Kesil discloses a thickness measurement system, wherein the amplitude detector detects a power (see FIG. 7A, where P_k represents power).

As per Claim 11, Kesil discloses a thickness measurement system (ABS., lines 1-2) for measurement of a film thickness of a sample (**F**), comprising;

a resonating means (**22**) for resonating an electromagnetic signal, having an exposed side (**24**) adapted to contact (column 10, lines 18-21) a portion of the surface of the sample (**F**);

a decoupler means (**36**) for decoupling signals from the resonating means (**22**), and connected to the resonating means (**22**);

a signal detecting means (**58**) for detecting an amplitude of signals (ABS., lines 13-15) from the decoupler means (**36**), and connected to the decoupler means (**36**);

a frequency signal generating means for generating frequency signals (combination of microwave generator **32** and frequency modulator **44**; see column 9, lines 52-55), coupled to the processing means (**52**: column 16, lines 2-6) and the decoupler means (**22**); and

a processing means for processing (**52**: column 16, lines 2-6), coupled to the signal detecting means (**58**), having;

correlating means (equation (10), in column 13) for correlating a resonant frequency shift (ω, where ω_o is the resonant frequency) detected by the detecting means (**58**) to the film thickness (δ) of the portion of the surface (**F**) of the sample being measured;

affixing means (actuating mechanism **131**) for pressing the exposed side of the resonating means against the portion of the surface of the sample (column 10, lines 18-21).

As per Claim 12, Kesil discloses a thickness measurement system, wherein the frequency signal generating means utilizes a Gunnplexer to generate frequencies (column 9, lines 38-41).

As per Claim 15, Kesil discloses a thickness measurement system, wherein the Gunnplexer is a Gunn Diode (column 9, line 41).

As per Claim 17, Kesil discloses a thickness measurement system, wherein the detecting means detects a voltage (see FIG. 7A-7C, where U_r represents voltage).

As per Claim 18. Kesil discloses a thickness measurement system, wherein the detecting means detects a power (see FIG. 7A, where P_k represents power).

As per Claim 22, Kesil discloses a method for thickness measurement (ABS., lines 1-2) for measuring a film thickness of a sample (**F**), comprising the steps of:

abutting (column 10, lines 18-21) an open faced electromagnetic cavity resonator (**22**) to a portion of the surface of a sample (**F**);

affixing the cavity resonator (using actuating mechanism **131**) to the surface of the sample (**F**) with a substantially uniform pressure;

sweeping frequencies (combination of microwave generator **32** and frequency modulator **44**; see column 9, lines 52-55) in the cavity resonator (**22**) using a signal generator having a Gunnplexer (column 9, lines 38-41);

detecting a resonant frequency (ω_o) of the cavity resonator (**22**) using a reflected energy detector (wave detector **66**); and

determining the thickness (δ) of the film (**F**) from a correlation of a shift of the resonant frequency (ω, where ω_o is the resonant frequency using equation (10), in column 13).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 2 & 13 and 9 & 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kesil et al., US 6,989,675, in view of Fathi et al., US 5,648,038

As per Claim 2 and 13, Kesil discloses the thickness measurement system as applied to Claims 1 and 11, above.

Kesil does not disclose the electromagnetic cavity resonator having a plurality of cavities.

Fathi discloses a resonating measurement system, wherein the electromagnetic cavity resonator has a plurality of cavities (cavities: **40a**, **40b**, **40c**; column 5, lines 41-42).

Therefore, it would have been obvious to a person of ordinary skill in the art to include a plurality of resonant cavities in the system of Kesil, as taught by Fathi, In order to measure the properties of various samples.

As per Claims 9 and 20, Kesil discloses the thickness measurement system as applied to Claims 1 and 11, above.

Kesil does not explicitly disclose a processing unit is a personal computer. Kesil does disclose a processing unit that is a network analyzer (column 16, line 3).

Fathi discloses a resonant measurement system wherein the processing unit **50** to be a personal computer (COMPUTER in FIG. 3A; column 4, line 42).

Therefore, it would have been obvious to a person of ordinary skill in the art to use a personal computer as the processing unit, as taught by Fathi, in the system of Kesil, in order to use a commercially available processor.

8. Claims 7, 8, 10, 19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kesil et al., US 6,989,675, in view of Little Jr., US 6,359,446.

As per Claims 7 and 19, Kesil discloses the thickness measurement system as applied to Claims 1 & 11 above.

Kesil does not explicitly disclose a DC supply coupled to the frequency generator. However, Kesil does disclose a power supply **42**.

Little discloses a DC supply coupled to the frequency generator (column 6, lines 7-11).

Therefore, it would have been obvious to a person of ordinary skill in the art to use a DC power supply coupled to the frequency generator, as taught by Little, in the

measurement system of Kesil, in order to deliver power to the frequency generator (column 6, lines 10-11).

As per Claim 8, Kesil discloses the thickness measurement system as applied to Claim 1 above.

Kesil does not disclose a varactor DC supply capable of controlling a frequency generator output frequency.

Little discloses using a varactor (column 4, lines 46-48) DC supply (column 4, lines 59-60) capable of controlling (i.e. tuning) a frequency generator (Gunnplexer) output frequency.

Therefore, it would have been obvious to a person of ordinary skill in the art to user a varactor, as taught by Little, in the measurement system of Kesil, in order to tune the frequency generator, in the instant case a Gunnplexer.

As per Claims 10 & 21, Kesil discloses the thickness measurement system as applied to Claims 1 & 11 above.

Kesil does not disclose the cavity resonator to be resonant at a natural frequency of approximately 10.6 GHz.

Little discloses the frequency generator (Gunnplexer) preset to 10 GHz (column 4, lines 50-53).

Therefore, it would have been obvious to a person of ordinary skill in the art to have a generator set to a frequency of 10 GHz, as taught by Little, in the measurement

system of Kesil, in order to test the properties of the material responsive to the set frequency.

9. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kesil et al., US 6,989,675, in view of Bitar et a., US 5,491,422.

Kesil discloses the thickness measurement system as applied to Claim 11, above.

Kesil does not explicitly disclose a resonator system, wherein the frequency signal generating means has Schottky diodes.

Bitar discloses a cavity resonating system, wherein the frequency signal generating means (i.e. transmitting means oscillator **202**) has Schottky diodes (**362** & **364**, see FIG. 3).

Therefore, it would have been obvious to a person of ordinary skill in the art to use a pair of Schottky diodes in the frequency generating means, as taught by Bitar, in the system of Kesil, in order to provide for fast switching times for oscillating signals.

10. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kesil et al., US 6,989,675, in view of Anderson, US 6,184,694.

Kesil discloses the thickness measurement method as applied to Claim 22, above.

Kesil does not disclose a thickness measuring method wherein the correlation is based on a first order equation.

Anderson discloses the method of thickness measurement wherein the correlation is based on a first order equation (see FIG. 6).

Therefore, it would have been obvious to a person of ordinary skill in the art to use a first order correlation equation for thickness measurement, as taught by Anderson, in the measuring method of Kesil, in order to simplify the equation.

Allowable Subject Matter

11. Claims 4 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art fails to anticipate or make obvious in combination a resonator thickness measuring system provided with an attachment assembly comprising a suction assembly that applies a pressure to the cavity resonator to secure the cavity resonator to a measurement sample.

Response to Arguments

12. Applicant's arguments with respect to claims 1-3, 5-15, and 17-23 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Stange, US 5500599, discloses a multiple cavity resonator for the measurement of thickness and other properties of film samples.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marina Kramskaya whose telephone number is (571)272-2146. The examiner can normally be reached on M-F 7:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on (571)272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Marina Kramskaya
Examiner
Art Unit 2858

Marina Kramskaya

MK

DIANE LEE
SUPERVISORY PATENT EXAMINER